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Haematomma pluriseptatum sp. nov. from China

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Abstract—A new species, *Haematomma pluriseptatum,* is described from southwestern China. This corticolous species is characterized by large ascospores with (19–)20–26(–27) septa and by the presence of atranorin, russulone, and pseudoplacodiolic acid. A detailed description of its morphology, high resolution photographs, chemistry, comments, and distribution are provided. Related lichen taxa are discussed, and a key to the species of *Haematomma* from China is also provided.

Key words—East Asia, *Haematommataceae*, *Lecanorales*, lichenized fungi, taxonomy

Introduction

The crustose *Haematomma* lichens, with their small but brilliant-red lecanorine apothecia, are often conspicuous on smooth-barked trees in warm-temperate to tropical regions of the world (Staiger & Kalb 1995, Brodo & al. 2008). *Haematomma* was proposed originally to house two species, *H. vulgare* A. Massal. and *H. ventosum* (L.) A. Massal. (Massalongo 1852). The genus is characterized by *Haematomma*-type asci, blood-red lecanorine apothecia, and transversely septate, submuriform to muriform

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ascospores (Brodo & al. 2001, Elix 2004, Nelsen & al. 2006, Nash & al. 2004, Smith & al. 2009). Apothecial pigmentation and secondary chemistry play important roles for species delimitation in this genus (Messuti & de la Rosa 2009). The number of spore septa is also used as an important character in separating species (Nelsen & al. 2006). Of the forty *Haematomma* species reported in the world, twelve have been reported in China (Brodo & al. 2001, Elix 2004, Nelsen & al. 2006, Nash & al. 2004, Smith & al. 2009, Tang & al. 2018). For this study, we examined about two hundred specimens of *Haematomma* morphologically and chemically, describe a new species, *H. pluriseptatum*, from China, and present a key to the species of *Haematomma* from China.

Materials & methods

Four collections are deposited in the Lichen Section of the Botanical Herbarium, Shandong Normal University, Jinan, China (SDNU), and one is deposited in the Lichen Herbarium of the Kunming Institute of Botany, Kunming, China (KUN). The specimens were examined morphologically and anatomically morphological under an Olympus SZ51 stereomicroscope and Olympus CX21 polarizing microscope. Both thallus and medulla were tested with K (a 10% KOH aqueous solution) and C (a saturated aqueous NaOCl solution). The lichen substances were identified using standardized thin layer chromatography techniques (TLC) with solvent system A and C (Orange & al. 2010). The specimens were photographed using a DP72 camera on Olympus SZX16 and BX61 microscopes.

Taxonomy

Haematomma pluriseptatum R. Tang, **sp. nov.** Fig. 1

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Differs from *Haematomma rufidulum* by its ascospores with more septa and its production of pseudoplacodiolic acid.

Type: China. Yunnan, Diqing Co., Shangri-La, Tianbao Mt., 27°36′37″N 99°53′37″E, alt. 3790 m, on bark of living trees, 17 Aug. 2018, Wang Chunxiao 20181135 (**Holotype**, SDNU).

Etymology: The epithet *pluriseptatum* refers to the morphology of the ascospores with many septa.

Thallus crustose, corticolous, pale greyish to greenish grey, rugose rimose-areolate to areolate, continuous, thickness 0.6 mm. Soredia and isidia absent. Apothecia scattered, 0.3–0.95(–1.0) mm diam., sessile, convex, constricted at the base, smooth when young, red. Disc orange-yellow to brownish yellow, white pruina present when young but absent when mature; Thalline margin well developed; amphithecium present, 70–90 μm thick.

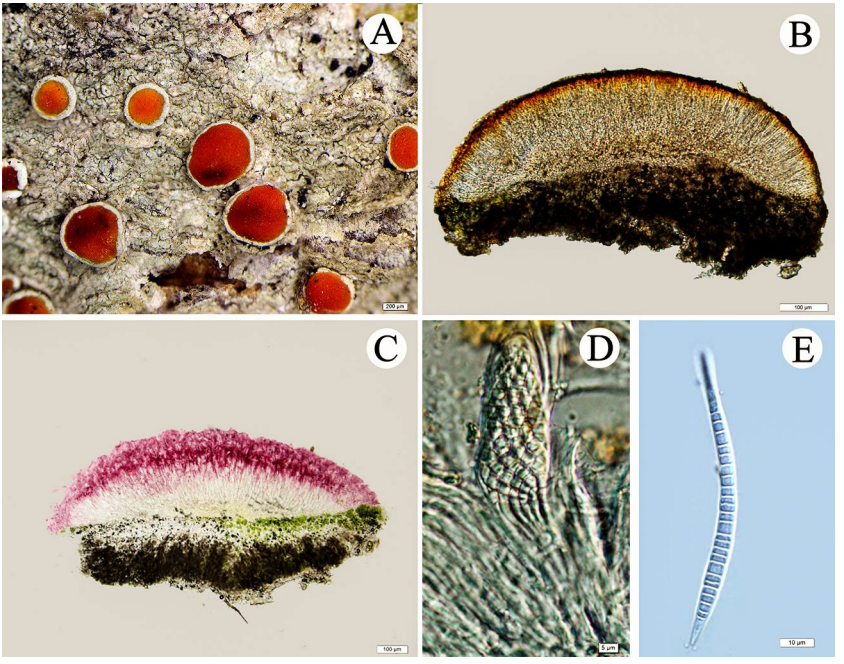

Fig. 1. ***Haematomma pluriseptatum*** (holotype, SDNU (Wang Chunxiao 20181135)). A. Thallus and apothecia; B. Apothecium section; C. K+ reaction (red) of epihymenium and outer exciple; D. Ascus; E. Ascospores. Scale bars: A = 200 μm; B, C = 100 μm; D = 5 μm; E = 10 μm.

Epihymenium orange, K+ red, 9–20 μm thick. Hymenium hyaline, 70–95 μm high. Hypothecium hyaline or slightly brown. Paraphyses branched and anastomosing. Asci clavate, containing 8 spores. Ascospores twisted in ascus, filiform, straight or slightly curved, (19–)20–26(–27)-septate, 70–95 × 5–6.5(–7) μm. Conidia absent.

Chemistry—Cortex K+ yellow, C–, KC–. Atranorin, russulone, and pseudoplacodiolic acid detected by TLC.

Additional specimens examined: **CHINA**. **Yunnan**, **Diqing Co.**, Shangri-La, Tianbao Mt., 27°36′37″N 99°53′37″E, alt. 3790 m, on bark of living trees, 17 Aug. 2018, Wang Chunxiao 20181175, 20181209, 20181126 (SDNU); **Deqin Co.**, Yubeng Village, Xiaonong Base Camp. 28°23.92′N 98°46.16′E, alt. 3500 m, on bark of living trees, 14 Sep. 2012, Niu Dongling 12–36322 (KUN-L).

Comments—*Haematomma pluriseptatum* is characterized by the large number of septa (20–27) in each ascospore and the presence of atranorin, russulone and pseudoplacodiolic acid in the thallus.

The new ascomycete is morphologically similar to *H. rufidulum* (Fée) A. Massal., which differs by the occurrence of slightly irregular, white, convex to hemispherical soredia and elongate-fusiform, 8–25-celled, 50–72(–85) × (3.5–)4–6(–7) µm ascospores (Brodo & al. 2008). Secondary metabolites also differ: *H. pluriseptatum* contains pseudoplacodiolic acid, while *H. rufidulum* contains placodiolic acid.

Haematomma pluriseptatum may also be confused with *H. dolichosporum* (B. de Lesd.) Kalb & Staiger, which also produces twisted spores in the asci, but *H. dolichosporum* is readily distinguished by its shorter (42–62 µm) spores with fewer (7–9(–11)) septa and the production of placodiolic acid (Staiger & Kalb 1995; Brodo & al. 2008).

Key to the species of *Haematomma* in China

1. Epihymenium with russulone, K+ red 2
1. Epihymenium with haematommone, K+ purple (entirely dissipating) 8
2. Thallus containing usnic acid ..... ***H. fauriei***
2. Thallus lacking usnic acid 3
3. On rock ..... ***H. fenzlianum***
3. On bark 4
4. Thallus containing placodiolic acid ..... ***H. rufidulum***
4. Thallus lacking placodiolic acid 5
5. Thallus lacking sphaerophorin 6
5. Thallus containing sphaerophorin, spores 6–14-celled 7
6. Thallus containing pseudoplacodiolic acid, spores 20–27–celled ..... ***H. pluriseptatum***
6. Thallus lacking pseudoplacodiolic acid, spores 8–16–celled ..... ***H. puniceum* subsp. *pacificum***
7. Spores 6–7-celled ..... ***H. persoonii***
7. Spores 10–14-celled ..... ***H. collatum***
8. Spores not submuriform 9
8. Spores submuriform ..... ***H. wattii***
9. Apothecia sorediate ..... ***H. caperaticum***
9. Apothecia not sorediate 10
10. Thallus containing isoplacodiolic, isopseudoplacodiolic acids ..... ***H. flexuosum***
10. Thallus lacking isoplacodiolic, isopseudoplacodiolic acids 11
11. Spores 7–12-celled ..... ***H. accolens***
11. Spores 17–24-celled ..... ***H. africanum***

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